

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Previously presented) A monitoring unit for monitoring the condition of a semi-permeable membrane, the monitoring unit comprising a flow chamber having a feed fluid inlet for permitting ingress of a feed fluid into the flow chamber; a fluid permeable support member for supporting a semi-permeable test membrane in the flow chamber, the support member constituting a base portion of the flow chamber such that feed fluid entering the flow chamber passes at least in part through the support member; at least one fluid outlet arranged in fluid communication with the flow chamber for permitting egress of fluid from the monitoring unit after having passed through the test membrane; and an inspection window for permitting visual inspection of the semi-permeable test membrane, the inspection window being oriented substantially parallel to and spaced from the support member such that the flow chamber is defined intermediate the support member and the inspection window; the monitoring unit being located in-line with a reverse osmosis water purification system intermediate a feed fluid tank and a membrane plant for monitoring fouling of the semi-permeable membrane in the reverse osmosis water purification system.

2. (Canceled)

3. (Canceled)

4. (Previously presented) The monitoring unit according to claim 1 further including a feed fluid outlet and wherein the flow chamber is dimensioned such that a fluid pressure interval is defined intermediate the feed fluid inlet and the feed fluid outlet.

5. (Previously presented) The monitoring unit according to claim 4 wherein the fluid pressure at the feed fluid outlet is less than that at the feed fluid inlet such that, in use, the feed fluid partly exits through the feed fluid outlet of the flow chamber and in part passes through the semi-permeable test membrane.

6. (Canceled)

7. (Canceled)

8. (Previously presented) The monitoring unit according to claim 1 wherein the support member is made of a high-density polyethylene, stainless steel, brass, or finely woven fiber porous material.

9. (Previously presented) The monitoring unit according to claim 8 wherein the support member includes pores of pore sizes between 10 and 150 μm .

10. (Previously presented) The monitoring unit according to claim 1 wherein the monitoring unit includes spacers for spacing the semi-permeable test membrane from the support member so as to provide a flow space between the test membrane and the support member.

11. (Previously presented) The monitoring unit according to either claim 10 or claim 45 wherein the monitoring unit accommodates different spacers that vary in thickness and shape, the arrangement being such that fluid dynamics of the feed fluid flowing across the semi-permeable test membrane are influenced through the use of different spacers.

Claims 12, 13, and 14 (Canceled)

15. (Previously presented) The monitoring unit according to claim 1 wherein the fluid outlet is arranged in fluid communication with a conduit for passing the fluid through the water purification system.

16. (Canceled)

17. (Previously presented) The monitoring unit according to claim 1 wherein the inspection window is made of a plastic, Perspex, or glass material, characterized therein that it can withstand a pressure of at least between 40 and 50 bar.

18. (Previously presented) The monitoring unit according to claim 1 wherein the monitoring unit includes regulating means for regulating flow across the test membrane and fluid pressure in the unit.

19. (Previously presented) The monitoring unit according to claim 18 further including a feed fluid outlet and wherein the regulating means is at least one valve arranged for regulating the fluid pressure interval intermediate the feed fluid inlet and the feed fluid outlet.

20. (Previously presented) The monitoring unit according to claim 19 wherein the monitoring unit includes at least one feed fluid inlet valve operatively associated with the feed fluid inlet; and at least one feed fluid outlet valve operatively associated with the feed fluid outlet of the flow chamber.

21. (Previously presented) The monitoring unit according to either claim 19 or claim 20 wherein the monitoring unit includes at least one fluid outlet valve at the fluid outlet for fluid passing through the test membrane.

22. (Previously presented) The monitoring unit according to claim 1 wherein the monitoring unit is operatively associated with pumping means for further manipulating fluid pressure in the monitoring unit.

23. (Previously presented) The monitoring unit according to claim 22 further including a feed fluid outlet and wherein the pumping means is a positive displacement pump arranged in-line with the monitoring unit and suitable for maintaining the fluid

pressure interval intermediate the feed fluid inlet and feed fluid outlet of the flow chamber.

24. (Previously presented) The monitoring unit according to claim 1 wherein the monitoring unit includes flow distribution means in the form of a manifold dimensioned for preventing turbulence within the flow chamber and for effecting homogenous fluid flow.

25. (Previously presented) The monitoring unit according to claim 24 wherein the manifold is an inlet manifold arranged intermediate the feed fluid inlet and the flow chamber for regulating flow of feed fluid into the flow chamber.

26. (Previously presented) The monitoring unit according to claim 24 wherein the monitoring unit includes a feed fluid outlet and an outlet manifold located intermediate the flow chamber and the feed fluid outlet, the outlet manifold being arranged such that it prevents areas of decreased flow in the flow chamber so as to prevent preferential foulant adsorption or biological growth.

27. (Previously presented) The monitoring unit according to either claim 25 or claim 26 wherein the manifolds are arranged so as to permit reverse flow through the monitoring unit for evaluating the effectiveness of back flushing on removal of impurities adsorbed onto the test membrane.

Claims 28 and 29 Canceled.

30. (Previously presented) The monitoring unit according to claim 10 wherein the monitoring unit comprises the potential of simulating, in the monitoring unit, fluid dynamics associated with the semi-permeable test membrane across the spacers and support member and is therefore adapted for monitoring fouling of the semi-permeable membrane during operation of the water purification system.

31. (Previously presented) The monitoring unit according to claim 30 wherein the monitoring unit operates at a fluid pressure of between 40 and 50 bar.

32. (Canceled)

33. (Currently amended) The monitoring unit according to claim 1 wherein the semi-permeable membrane is a spiral ~~reverse osmosis~~ membrane and the monitoring unit is adapted for monitoring fouling of the spiral membrane in the water purification system ~~the monitoring unit is located intermediate a feed fluid tank and a spiral membrane plant of the spiral reverse osmosis water purification system.~~

34. (Currently amended) A method of monitoring fouling of a semi-permeable membrane in a water purification system, the method comprising the steps of: providing in line with the water purification system, intermediate a feed fluid tank ~~an~~ and a membrane plant, a monitoring unit; the monitoring unit comprising a flow chamber having an inlet for permitting ingress of a feed fluid into the flow chamber, ~~at least one fluid outlet arranged in fluid communication with the flow chamber,~~ at least one fluid outlet arranged in fluid communication with the flow chamber for permitting egress of fluid ~~from~~ from the monitoring unit after having passed through a semi-permeable test membrane provided within the chamber; and an inspection window for permitting visual inspection of the semi-permeable test membrane; placing the semi-permeable test membrane on a fluid permeable support member; effecting at least partial passage of feed fluid through the test membrane; and visually monitoring fouling of the test membrane through the inspection window ~~as an indication~~ for determining fouling of the semi-permeable membrane in the water purification system.

35. (Previously presented) The method according to claim 34 wherein the method comprises the step of effecting at least partial passage of feed fluid through the

test membrane such that fouling of the semi-permeable membrane is monitored during operation of the water purification system.

36. (Previously presented) The method according to either claim 34 or claim 35 wherein the method includes the step of monitoring fouling of a semi-permeable spiral reverse osmosis membrane.

37. (Previously presented) The method according to claim 34 wherein the test membrane is removably placed on the support member and is spaced from the support member by spacers.

38. (Currently amended) The method according to either claim 34 or claim 37 wherein the test membrane is a flat-sheet semi-permeable membrane and the support member is a polymeric support material.

39. (Previously presented) The method according to claim 34 wherein fouling of the test membrane is also monitored by means of monitoring equipment, selected from the group consisting of laser beam or infrared refraction, or sound acoustics.

40. (Previously presented) The method according to claim 34 wherein flux of water through the semi-permeable test membrane is measured by maintaining flow and pressure constant through the monitoring unit, the arrangement being such that any deviation in the flux through the test membrane is attributable to adsorption of impurities onto the test membrane, which changes the permeability characteristic of the test membrane.

41. (Currently amended) The use of a monitoring unit including a semi-permeable test membrane for evaluating, by visual and physical inspection, one or more of the following operating parameters in a water purification system, the parameters including: the efficiency of different types of chemicals utilized in the system, the effect

of using different membranes and/or associated spacers on the operating efficiency in the water purification system, and efficiency of different membrane cleaning methods; the use including the steps of locating the monitoring unit in-line with the water purification system, wherein the monitoring unit comprises a flow chamber having an inlet for permitting the ingress of a feed fluid into the flow chamber, at least one fluid outlet arranged in fluid communication with the flow chamber for permitting the egress of fluid from the monitoring unit, and an inspection window for permitting visual inspection of the test membrane, and a fluid permeable support; placing the semi-permeable test membrane on the fluid permeable support member, and effecting at least partial passage of feed fluid through the test membrane to simulate operating conditions of the water purification system in the monitoring unit.

42. (Currently amended) The use of a monitoring unit including a semi-permeable test membrane for evaluating, by visual and physical inspection, one or more of the following parameters in a spiral membrane ~~spiral~~ reverse osmosis water purification system, the parameters including ~~namely~~: fouling of the spiral membrane; the efficiency of different types of chemicals utilized in the system; the effect of using different membranes and/or associated spacer means in the water purification system on the operating efficiency of the system; and efficiency of different membrane cleaning methods; wherein the monitoring unit comprises a flow chamber having an inlet for permitting ingress of a feed fluid into the flow chamber; at least one fluid outlet arranged in fluid communication with the flow chamber for permitting egress of fluid from the monitoring unit; and an inspection window for permitting visual inspection of the test membrane; the use including the steps of locating the monitoring unit in-line with the reverse osmosis water purification system, at least partially supporting the test

membrane in the flow chamber; and effecting at least partial passage of feed fluid through the test membrane to simulate operating conditions of the water purification system in the monitoring unit.

43. (Previously presented) A water purification system including at least one water-cleaning unit, the water purification system characterized therein that it includes a monitoring unit that comprises a flow chamber having a feed fluid inlet for permitting ingress of a feed fluid into the flow chamber, a fluid permeable support member for supporting a semi-permeable test membrane in the flow chamber, the support member constituting a base portion of the flow chamber such that feed fluid entering the flow chamber passes at least in part through the support member, at least one fluid outlet arranged in fluid communication with the flow chamber for permitting egress of fluid from the monitoring unit after having passed through the test membrane; and an inspection window for permitting visual inspection of the semi-permeable test membrane, the inspection window being oriented substantially parallel to and spaced from the support member such that the flow chamber is defined intermediate the support member and the inspection window; the water purification system further being characterized therein that the monitoring unit is located in-line with the water purification system intermediate a feed fluid tank and a membrane plant for monitoring fouling of a semi-permeable membrane in the water purification system.

44. (Previously presented) The use of a monitoring unit in a water purification system wherein the monitoring unit comprises a flow chamber having an inlet for permitting ingress of a feed fluid into the flow chamber; a fluid permeable support member for supporting a semi-permeable test membrane in the flow chamber, the support member constituting a base portion of the flow chamber such that feed fluid

entering the flow chamber passes at least in part through the support member; at least one fluid outlet arranged in fluid communication with the flow chamber for permitting egress of fluid from the monitoring unit after having passed through the test membrane; and an inspection window for permitting visual inspection of the semi-permeable test membrane; the use including the steps of locating the monitoring unit in-line with the water purification system, placing the semi-permeable test membrane on the fluid permeable support member, and effecting at least partial passage of feed fluid through the test membrane to simulate operating conditions of the water purification system in the monitoring unit.

45. (Currently amended) The monitoring unit according to claim 10 wherein the monitoring unit further comprises at least a second semi-permeable test membrane adjacent the semi-permeable test membrane, and the spacers ~~provides~~ provide a flow space between the adjacent test membranes and the support member.

46. (Canceled)